

COMPUTER SCIENCE I

1. Binary number 011 subtracted from binary 101 gives :
 a) 010 b) 011 c) 101 d) None
2. Two's complement of a binary number can be found out by :
 a) Changing Zero's to One's and adding 1
 b) Finding One's complement and adding 1
 c) Changing One's to Zero's and adding 1
 d) Changing Zero's to One's and adding its compliments
3. Decimal number 328 when expressed in BCD code gives :
 a) 001100101000 b) 00110101000
 c) 0101001001 d) 001101010
4. Decimal number 3 converted into Gray Code gives :
 a) 0011 b) 0100 c) 0010 d) None
5. It is desired to have an output given by $A+B$ from available A and B inputs.
 Logic circuitry needed is :
 a) A NAND gate only b) Two NOTS and one OR
 c) One AND and one NOT d) NONE
6. Of all the logic families, faster speed is exhibited by
 a) TTL b) CMOS c) ECL d) NMOS
7. MOS and CMOS logic families use :
 a) Saturated bipolar transistors b) Non-saturated bipolar transistors
 c) MOS devices d) Mixture of MOS and bipolar devices
8. A clocked JK flip-flop differs from a clocked R-S flip-flop in the respect that :
 a) It has entirely different truth-table
 b) It avoids the ambiguity arising in the output condition from a 1 - 1 input
 c) It is faster d) None
9. A FULL ADDER for 1 binary operation, whether serial or parallel, typically consists of :
 a) Two half adders b) Four half adders
 e) Two half adders and an OR - gate b) Two half adder and an AND - gate

**OFFICE OF THE LIAISON OFFICER
FOR
SCHEDULED CASTES/TRIBES**

Dear Friends,

We understand that you are a candidate for the probationary Engineer's test to be conducted by our Company. Therefore, we enclose a set of model question papers for you to feel the modality of the test. All the questions are of objective type with negative marks for wrong answers. Please remember that these questions are only model question paper and may not appear in the test. While preparing the test, mere looking for the answers a or b or c or d is not sufficient but prepare yourself to the level up to the root level for the answers. We hope this tutorial material enclosed will be useful and you may be benefited. It is also understood that there may be some questions about 10 for short answers. The undersigned thanks Management, SC/ST Welfare Association of our Organisation for their sincere encouragement and full co-operation to uplift the SC/ST candidates.

Wish you all the best.

Thanking you,

Yours Sincerely

T.K. RAJA
Liaison Officer for SC/ST

A Register in a digital system is used :

- a) For addition of digital data b) For subtraction of digital data
- c) For storage of digital data d) For storage of permanent data

To store an n-bit binary number in a register, we require :

- a) n flip-flops b) $n/2$ flip-flops
- c) $2n$ flip-flop d) $(n+1)$ flip-flops

In any computer program, the fundamental or basic elements are :

- a) The number and types of statements it contains
- b) The size of the character set or alphabet it deploys
- c) The operators and operands it contains
- d) The difficulty of comprehension

From the view point of maintenance, which one of the following is generally considered to be the most important consideration when establishing the size of a program module during program design :

- a) It should not be longer than one coding sheet
- b) It should fit in less than one page of memory
- c) It should be small enough to comprehend
- d) It should not exceed the maximum disk block size

Consider the following routine written in a procedure language :

```
MODULE FACTORIAL (N) : RETURN (IF N=1)THEN N ELSE  
FACTORIAL (N-1) * N; END FACTORIAL;
```

Which phrase below is the best description of this routine ?

- a) An interactive function b) A recursive function
- c) A two-section function d) A structured function

The three main control structures recommended by advocates of structured programming are :

- a) Sequential, recursion, and iteration b) Call, Close and conditional
- c) Dimension call and format d) Sequential, conditional and iteration

Consider the following fragment of code :

```
I = 1; CASE I x 3 of I=1; I=2; I=4; END CASE;
```

following its execution "I" will have the value :

- a) 1 b) 2 c) 3 d) 4

17. Consider the following fragment of code written in a procedural language :

```
A = 6;  
LOOP: DO INDEX = N TO 10 BY 1;
```

```
A = A + 1; END LOOP;
```

```
PRINT A;
```

```
;
```

Assuming that the DO statement is translated in such a way that testing is performed at the beginning of the loop, the value of 'A' that will be printed when the loop entered with $N = 12$ is :

- a) 6 b) 7 c) 8 d) 9

18. Which one of the following best characterizes the hash coding table search technique :

- a) The technique is applicable only to single-word character strings
- b) The search time increases with size of the table
- c) The initial probe is a function of the search argument
- d) The search time is independent of the number of active table entries

19. If data are stored in a linearly linked list which one of following is true :

- a) All data must be stored in contiguous storage locations
- b) Storage spaces beyond that used for the data is needed to store the linkage information
- c) All data must be stored as characters since only character strings can be stored in a linked list
- d) A new data element cannot be inserted into the middle of the list structure without creating a new list and then deleting the old one

20. Which one of the following statements is not applicable to a buffer between a sending and receiving process ?

- a) A buffer smooths speed variation between the processes
- b) A buffer permits a receiving process to consume message at a speed that is independent of the sending process
- c) A buffer permits a sending process to occasionally generate messages at speed faster than the receiving process can consume them
- d) A buffer's limits capacity may limit the speed at which the sending process operates

21. Which one of the following items is not generally used as a "control" over the data accuracy of an input file ?

- a) Check Sum b) Interruption Count c) Hash total d) Record count

The incorporation of a module's 11 check field into a numeric code will permit detection of ... % of all double transposition errors :

- a) 0 b) 50 c) 90 d) 100

Which of the following are practical methods for generating an address from a record key when a hashing scheme is used :

- a) Division/Remainder method b) Folding
- c) Multiplication by 2 d) Radix transformation

Which of the following are advantages of integrated database system over conventional file systems :

- a) Shared access to data b) No data validation is required
- c) Controlled amount of data redundancy
- d) Easier enforcement of protection policies

Data independence, a highly desirable property of a database management system (DBMS) implies the immunity of application programs to changes in the logical structure of the data. Which of the following features does not necessarily support the concept of data independence :

- a) Schemes/Sub scheme facilities in data definition languages
- b) Efficient access mechanisms c) Data dictionaries
- d) Uniform treatment of data and relationships

In the Demand paged memory scheme :

- a) The job is not executed until the complete address space of the job is loaded
- b) Thrashing can occur if the replacement scheme is not good
- c) Memory will often contain information that is seldom used by the job
- d) Thrashing will always occur

Round robin is a technique applicable in :

- a) High level process scheduling b) Low level process scheduling
- c) Memory management d) I/O management

In process scheduling Race conditions can occur

- a) if one process is faster than another
- b) due to improper synchronization of two processes which share data or resources
- c) due to improper scheduling of two processes which share data or resources
- d) When only one process is being run and it wants to output data

Spooling is used for :

- a) transferring data on to a mag tape spool
- b) on-line printing of computer reports
- c) off-line printing of computer reports d) transferring data on to a disk

30. The standard RS232C interface is intended for :

- a) high speed date transfer b) use with remote terminals
- c) computer to peripheral interconnection
- d) processor to memory interconnections

31. The term 'buckets' is used for :

- a) Collection of records for a particular has address
- b) A set of contiguous memory locations in which data is transferred one after other
- c) A no. of values contained in an ordinal type d) a sequence of bytes

32. The ordering of a computer character set is called :

- a) ASCII Code b) Collating Sequence c) Character String d) Cardinality

33. The separation of logical properties of data ignoring in essential details is called :

- a) Data Encapsulation b) Data Retrieval
- c) Data Abstraction d) Data Encryption

34. Hashing is a technique for ordering and accessing elements in a list in :

- a) Constant Time b) Minimum Time c) Optimum Time d) Unique Time

35. An ordinal value identifying a particular component of a data structure is called an :

- a) Infix b) Input c) Identifier d) Index

36. Interpreter is a program which translates from high order language to machine code

- a) Line by Line b) In Modules
- c) Completely d) Statement-wise

37. The ability of software written in a computer to run successfully on different machine is called :

- a) Code Efficiency b) Multiple Access
- c) Portability d) Multiprogramming

38. A set of distinct values that are ordered is called :

- a) Scalar Data Types b) Integer Data Types
- c) Vector Data Types d) Simple Data Types

39. Nodes in a tree that have the same parent node are called :

- a) Branch Nodes b) Siblings c) Children d) Subtrees

40. The ability of a function to call itself is named :

- a) Random Access b) Robustness c) Recall d) Recursion

41. Stack overflow occurs when an element is :
 - a) Pushed on to a full stack
 - b) Popped from an empty stack
 - c) Pushed on to an empty stack
 - d) Popped from a full stack
42. The term time sharing is used when a computer is shared by :
 - a) Several users one after the other
 - b) Several programmes at the same time
 - c) Several users simultaneously
 - d) Several tasks concurrently
43. A data structure consisting of a set of nodes and a set of edges that relate the nodes is called :
 - a) Graph
 - b) Tree
 - c) Array
 - d) Block
44. A global variable that initialises a random number generator is called :
 - a) Scope
 - b) Seed
 - c) Sentinel
 - d) Stack
45. A data structure in which elements are entered at one end and removed from the other is called :
 - a) Array
 - b) LIFO Stack
 - c) Queue
 - d) Order
46. An example of secondary storage is :
 - a) RAM
 - b) PROM
 - c) Disk
 - d) CCD
47. A special data value to mark the end of a data file called :
 - a) End item
 - b) Sentinel
 - c) Root
 - d) Scope
48. The phase of the program execution in which program instructions are performed is called :
 - a) Real Time
 - b) Program Time
 - c) Run Time
 - d) Access Time
49. The phase which takes the largest portion of the life time of a program is :
 - a) Coding
 - b) Debugging
 - c) Maintenance
 - d) Documentation
50. The code of the program can be considered part to the documentation, if it is :
 - a) Structured
 - b) Self-documented
 - c) In High Level Language
 - d) neatly printed

Study the following declarations and answer question 51 :

TYPE PEOPLE = RECORD

```

      NAME : ARRAY(1 .. 20) OF CHAR;
      BDATE : INTEGER;
      AGE : INTEGER;
      ADDRESS : ARRAY (1 .. 15) OF CHAR
    END; (* record *)
  
```

VAR PERSON : PEOPLE;

51. The most important feature needed in a high level language is :
 - a) Shared data
 - b) Non sequential (does not wait for input)
 - c) Synchronization
 - d) None of the above
52. The language C was developed by
 - a) Richard
 - b) Steve Jobs
 - c) Dennis Ritchie
 - d) Bill Gates
53. The first high level language was developed by
 - a) John McCarthy
 - b) Alan Turing
 - c) Grace Hopper
 - d) Steve Jobs
54. A language used for writing machine language programs is
 - a) High Level Language
 - b) Natural Language
 - c) Artificial Language
 - d) Pseudo Code
55. A modem is a device for
 - a) Sending voice digitally
 - b) Connecting data terminal to a telephone line
 - c) Sending analog signals
 - d) Receiving digital signals
56. PDU means the protocol of analog modems to
 - a) A form of modulation which uses code for transmission
 - b) A form of pulse modulation which uses amplitude
 - c) A modulation scheme that converts a wave into binary
 - d) A way of representing data in binary form to transmit information
57. For multiplexing high speed data channels are
 - a) A twisted pair of wires
 - b) A coaxial cable
 - c) Optical fibers
 - d) A fiber optic cable
58. For working on a LAN the following is required
 - a) A hub
 - b) A switch
 - c) A bridge
 - d) A repeater
59. For working on a LAN the following is required
 - a) A twisted pair of wires
 - b) A coaxial cable
 - c) Optical fibers
 - d) A fiber optic cable
60. The radio circuit SIGA
 - a) carries messages between two stations
 - b) carries messages between two stations
 - c) carries messages between two stations
 - d) carries messages between two stations
61. Turbine is a source of power to
 - a) Nuclear fission
 - b) Nuclear fusion
 - c) Nuclear fission
 - d) Nuclear fusion
62. For working on a LAN the following is required
 - a) A hub
 - b) A switch
 - c) A bridge
 - d) A repeater
63. A form of communication which uses code for transmission
 - a) Analog
 - b) Digital
 - c) Analog
 - d) Digital
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 - b) Digital
 - c) Analog
 - d) Digital

54. A node in a linked list must contain :
- Data and an integer
 - Integer and a pointer
 - Data and a pointer
 - String and a pointer
55. In FORTRAN you would have to represent pointers as :
- Arrays
 - Array Indexes
 - Linked lists
 - Data
56. For the use of recursive functions, a programming language should be :
- Structured Statement
 - Static Storage allocation
 - Dynamic Storage allocation
 - Subroutine call facility

57. Given the array, DATA, containing the elements :

41	56	20	31	59	15
----	----	----	----	----	----

- (1) (2) (3) (4) (5) (6)

A bubble sort after the fourth iteration will produce :

- 15 20 31 41 56 59
- 15 20 31 56 59 41
- 15 20 31 56 41 59
- 15 20 31 59 41 56

58. If there are N records in a list, the no. of comparisons to locate an element by binary search is :
- N
 - 2N
 - \log_2
 - N^2
59. The purpose of hashing is to :
- Minimise run time overheads in the computer
 - Maximise throughout of the programme
 - Distribute the no. of records randomly in a table
 - Minimise comparisons in a search
60. Collision is a condition when :
- Two keys produce the same address
 - Two keys are having the same value
 - Two more keys produce the same hash address
 - Data types clash
61. A Hash function manipulates the key of a record to produce a :
- Unique location
 - Minimum value
 - Constant time of access
 - Subroutine
62. The term 'heap' refers to :
- Area of memory from which user may obtain space during run time
 - Garbage collection for reclaiming space that is no longer needed
 - A contiguous area of memory in which less frequently used data is stored
 - A segment of memory for general purpose use

63. The most important feature needed in a language to support parallel processing is :
- Shared data
 - Concept of process
 - Synchronisation
 - Dual porting
64. The language C was designed and implemented by :
- Richards
 - Johnson and Kermighan
 - Dennis Ritchie
 - Nilaus Wirth
65. The preorder notation of the following binary expression tree is :
- $*/+a b c d$
 - $((a+b)/)*d$
 - $ab+c/d *$
 - $(a+b)/(c+d)*$
66. A Language based on a set of rules established prior to its usage is called :
- High Level Language
 - Natural Language
 - Artificial Language
 - Pseudo Code
67. A modem is a device for :
- Sending voice digitally
 - Sending data on telephone lines
 - Connecting data terminal equipment to a communication line
 - Sending asynchronous serial data on a communication channel
68. Pulse code modulation is a term used for :
- A form of modulation which uses code for transmission
 - A form of pulse modulation that sends quantized values of instantaneous samples by code
 - A modulation process that converts a wave form from Analog to Digital form
 - A device for varying one or more of the characteristic of a pulse train so as to transmit information
69. For multiplexing high speed data communication, the medium that can be used is :
- A twisted pair of wires
 - A coaxial cable
 - A flat cable
 - a fibre optic cable
70. The battery type used for backing up CMOS RAMs is usually :
- Lithium
 - Magnesium Manganese oxide
 - Nickel Cadmium
 - Lead acid
71. For verifying a list of n items in the correct order, the minimum no. of comparison keys is :
- n
 - n^2
 - 2^n
 - $n - 1$
72. A graph is said to be a diagram :
- If it contains vertices and edges
 - If edges are ordered
 - If vertices are distinct
 - If the graph is undirected

73. A vector processor is one which can :
- Manipulate floating point numbers
 - Manipulate arrays of numbers simultaneously
 - Represent numbers in the form of vectors
 - Effectively use cache memory
74. The Intel i 860 is an example of :
- RISC Processor
 - Parallel Processor
 - Systolic array
 - Instruction set architecture
75. A procedure for solving a problem by dividing it into small basic elements and solving differential equations in each of those element is called :
- Discretions
 - Boundary element method
 - Finite element analysis
 - Solid modeling
76. An example of no-volatile and field alterable memory is :
- PROM
 - CDROM
 - EEPROM
 - CMOS RAM
77. The minimum energy required for a valence electron in a semiconductor to become a conduction electron is called :
- Band gap
 - Lattice constant
 - Epitaxy
 - Compound energy
78. The policy making body in India on matters of Computer Science is :
- Computer Society of India
 - Department of Electronics
 - Department of Science and Technology
 - Technology Mission
79. Recursion is a programming style that lends itself to solve problems quickly. Recursion is :
- Always possible
 - Possible only if the nature of the problem itself is recursive
 - Not always possible, but requires re-entrant code
 - Possible in functions only
80. Software libraries are intended to :
- Provide ready made program functions and procedures
 - Ease the task of programming
 - Provide specific and frequently used functions and procedures addressing a particular data function or hardware element
 - Be used when required
81. Quicksort is one of the fastest sorting algorithm because :
- It uses exchange method
 - It can be coded recursively
 - It uses division of the array recursively
 - It was invented by CAR Hoare

82. Stack is opposite of Queue because :
- a) It has a LIFO accessing
 - b) It uses only one pointer
 - c) It is implemented in hardware
 - d) Cannot be programmed in high level languages
83. Although legal to a compiler, which of the following should never be a global variable ?
- a) Int i
 - b) Int read-index
 - c) A1: array [1 .. 10] of char
 - d) Char name
84. For a 16 bit microcomputer using the 8088 or 80286 microcomputer, a proper statement using an int constant is :
- a) n=1.0
 - b) n=32,767
 - c) n=12000
 - d) n=40000
85. In an integer assignment statement $m = 40000 + 3$ the value will be :
- a) 40003
 - b) Depends on the implementation
 - c) 7235
 - d) Indeterminate
86. In a very poor system floating point numbers have a precision of one decimal place. In this system will 'shut-down' execute for the following code segment where V1 and V2 are floating point variables :
- V1 = 1.03 V2 = 1.07 if (V1 = V2) shutdown ;
- a) YES
 - b) NO
 - c) Depends on implementation
 - d) Indeterminate
87. Software Engineering recommends use of structural design and programming practices. Once the design is complete, the programming of many modules can proceed in parallel. The flow of control in structured programming is :
- a) Strictly sequential except for jumps
 - b) Organised as sequences, alternatives and loops
 - c) Like parallel strands of spaghetti
 - d) None of the above
88. After you have an idea and a plan, the programming cycle typically goes in which sequence :
- a) Compile, Edit, Test
 - b) Edit, Compile, Link, Test, debug
 - c) Link, edit, compile, test
 - d) Edit, test, debug, compile

How many blocks are required to rewrite the pseudocode in a structured programme :
Set 1 to 1001

A : If 1 is a prime number Display 1 Stop

Add 2 to 1

If 1 is greater than 1050

Display "No Prime numbers k beyond 1050" Stop Else Goto A

- a) 10
- b) 5
- c) 2
- d) 3

If p=3 and q=2, where p & q are integer variables, what is the value of r in the statement, assuming integer arithmetic ?

$$r = (p/q) * (q/p)$$

- a) 3
- b) 1
- c) 0
- d) 5

Using the principle of presence of operators, what will be the result of the following segment of program to execute the print statement :

```
m := a; n := b;
If (a < b = m < n)
```

Print ("Propositional logic creates no new truth")

- a) Sometimes depending on all of a, b, m and n
- b) Sometimes depending on values of a & b
- c) Always
- d) Never

In the following pseudocode, statement y is executed if :

```
if (a)
  If (b)
    x;
  Else
    y;
Else
```

- a) a & b are both false
- b) a is true and b is false
- c) a is false and b is true
- d) a & b are both true

An extern statement is always a :

- a) Declaration
- b) Definition
- c) Both of the above
- d) None of the above

94 Assume a function SIZEOF (V) returns the size of any variable in number of bytes given under V. What is the value of "num-elements" if "an-array" is an array of 10 integers in the following :

$$\text{num-elements} = \text{SIZEOF}(\text{an-array}) / \text{SIZEOF}(\text{an-array}[0])$$

- a) 20
- b) 1
- c) 2
- d) 10

95. Is it possible to write a program which, when executed, displays its own source code :

- a) Always yes
- b) Never
- c) Depends on compiler
- d) Depends on language

96. An uninitialised array of pointers will contain :

- a) All Null values
- b) Indeterminate
- c) Depends on compiler
- d) All zeros

97. The element stored in a 5x5x5 array HUMIDITY immediately after HUMIDITY [i] [j] [k] could never be (for i, j, k ≠ 0)

- a) HUMIDITY [i] [j+1] [0]
- b) HUMIDITY [i] [j] [k+1]
- c) HUMIDITY [i] [j+1] [k]
- d) HUMIDITY [i+1] [0] [0]

98. In a circular queue formed out of a circularly linked list, queue empty condition is indicated by which of the following where beg and end are pointers of the linked list :

- a) beg equal to end
- b) beg points to next element compared to end
- c) end points to next element compared to beg
- d) beg and end both are equal to null

99. In order to construct a forest of binary trees of 4 levels, the nodes should be structures with at least the following number of pointer variables :

- a) 1
- b) 4
- c) 2
- d) 8

100. The left link of the root node of a two level binary tree (3 nodes) is

- a) Null
- b) Points to the head of the tree
- c) Points to the other node
- d) None of the above

COMPUTER SCIENCE - II

The two cycles or phases that occur as each program instruction is considered are -

- a) synchronous and clocking
- b) clocking and clocking
- c) pulsation and clocking
- d) instruction and execution

The sequence of steps followed in a system study is -

- a) Problem definition, system design, system analysis, programming and implementation
- b) Problem definition, system analysis, programming & implementation
- c) system analysis, system design and system implementation
- d) Problem definition, system analysis, system design, programming analysis, program preparation and implementation

Given a 32 bit word CPU, which technique would be best to represent 0.075 ?

- a) Integer
- b) Two's complement
- c) One's complement
- d) Floating point

The ASCII code in hexadecimal for the number 5 is -

- a) 5
- b) 65
- c) 35
- d) 105

If the address space of a computer system is from 0 to 32767, how many address bits are necessary for addressing -

- a) 10
- b) 2
- c) 16
- d) 15

Which of the following languages is often translated to pseudo code ?

- a) Assembly
- b) FORTRAN
- c) BASIC
- d) Pascal

The relationship between the vendor code and the vendor name in a data base is (d
an example of -

- a) a global logical view
- b) a plex data structure
- c) a one to one relationship
- d) None of the above

"Bill of materials" where the final product is broken down into sub-assemblies upto the part level is an example of a _____ structure -

- a) plex
- b) hierarchical
- c) root
- d) none of the above

A data base management system which deal with all data inter relationships in terms of normalised, two-dimensional linkages is classified as -

- a) Integrated
- b) Structured
- c) Relational
- d) Network

10. A user could run a program larger than main memory by which of the following techniques ?
 - a) Multiprogramming
 - b) Time sharing
 - c) Overlays
 - d) Multiprocessing
11. The Least Recently used strategy is used for -
 - a) determining available I/O resources
 - b) determining available memory pages
 - c) determining file locations
 - d) none of the above
12. Which of the following search procedures on the average provides the fastest search for given data item -
 - a) Sequential search
 - b) Binary search
 - c) Hashing
 - d) Direct search
13. The primary difference between a linking loader and an absolute loader is -
 - a) The linking loader has more pointers
 - b) The absolute loader is only for micro processors
 - c) The linking loader may relocate an object module
 - d) They are the same
14. The program structure in which the program takes one of several paths, typically depending on the value of a coded data item, is -
 - a) DO WHILE
 - b) IF THEN ELSE
 - c) CASE
 - d) DO UNTIL
15. When constructing a directory, what size should be selected for each sub-list, if the list has a total of 100 items ?
 - a) 100
 - b) 10
 - c) 1
 - d) 25
16. If the list having total of 100 items is structured for a binary search, what would be the maximum number of looks over required ?
 - a) 6
 - b) 7
 - c) 8
 - d) 10
17. Many personal computers implement BASIC in ROM, however, it can be maintained on disk. One disadvantage of having BASIC on disk is -
 - a) Execution time is increased
 - b) a Disk drive is required
 - c) Multiprogramming is precluded
 - d) None of the above
18. The representation of $(1448)_{10}$ in a floating point mode with 9 bit mantissa and 7 bit exponent is -
 - a) 11011100000000000
 - b) 0000111110000111
 - c) 1000100001100001
 - d) 0101101010001011

Assuming that a 1024×1024 pixel display is used with refresh rate of 60 times/second, the time available to retrieve and display one pixel is -

- a) about 30 msecs
- b) about 15 micro sec.
- c) about 15 nsec
- d) about 30 micro secs.

A decoder is a combinational circuit with -

- a) n inputs and atleast 2 outputs
- b) 2 Inputs and n outputs
- c) n inputs and at most 2 outputs
- d) n inputs and n outputs

If A, B, C are inputs and S (sum), CO (carry) are the outputs of a full adder, then-

- a) $S = A + B + C$, $CO = AB + AC + BC$
- b) $S = A + B + C$, $CO = ABC$
- c) $S = (A + B) + C$, $CO = ABC$
- d) $S = AB + AC + ABC$, $CO = A + B$

FIFO is mostly used to :

- a) buffer data
- b) store variables
- c) handshake processes
- d) take care of difference in transfer rates

The number of bits in Hamming code for the original message in BCD is -

- a) 4
- b) 7
- c) 6
- d) 8

'LIST' is

- a) data type
- b) set elements
- c) array
- d) data structure

The operation $/41=5$ is correct atleast in one numbering system. The possible base is -

- a) 5
- b) 7
- c) 6
- d) 10

Power consumed by a CMOS logic is directly proportional to :

- a) clock speed
- b) power supply voltage
- c) input voltage
- d) output voltage

On the standard Recursive routine implementing a solution to the Towers of Hanoi, the number of disks moved is -

- a) $2 - 1$
- b) 2
- c) $2 + 1$
- d) $2 + 2$

The time taken to sort n items using bubble sort technique will be :

- a) $O(N)$
- b) $O(\log N)$
- c) $O(N \log N)$
- d) $O(N^2)$

29. Module TICKY (X) (Input X is a+ve integer) while $X > 1$ do If X is EVEN
then SET X TO $X/2$ else SET X TO $3X + 1$

The algorithm shown

- a) terminates for odd x
- b) it is difficult to say whether or not it terminates in every case
- c) terminates for all prime numbers
- d) terminates for perfect numbers

30. Direct access memory is used to transfer data from :

- a) memory to memory
- b) I/O to memory
- c) I/O to I/O
- d) Source to destination without CPU's effort

31. Module X (x, y)

(x, y are non negative integers)

- if $x = 0$
then ANSWER IS $y + 1$
- else if $y = 0$
then ANSWER is $X(x - 1, 1)$
- else ANSWER is $X(x - 1, x(x, y - 1))$

The above algorithm -

- a) evaluates the value of Fermat's last theorem
- b) generates Fibonacci numbers
- c) never terminates
- d) evaluates Ackermann's function

32. Memory Fetch : 4 cycles

Decode : 1 cycle

Execute : 1 cycle

How many cycles will be utilised to add a memory operand to internal register if a two wait state memory is used ?

- a) 7 Cycles
- b) 6 Cycles
- c) 14 Cycles
- d) 12 Cycles

33. The fibonacci sequence is -

- a) 0, 1, 2, 3, 5, 8, 13,
- b) 1, 1, 2, 3, 5, 8, 13,
- c) 0, 1, 1, 2, 2, 3, 3, 5, 8, 13,
- d) 0, 1, 1, 2, 3, 5, 8, 13,

34. If $A + B + C = D$ then $C =$

- a) $A + B - D$
- b) $\bar{A} + \bar{B} + D$
- c) $D + (A + B)$
- d) $D + E + A$

The major resources controlled by the operating system are -

- a) memory, devices, processes b) memory, devices, information
- c) processors, information, memory d) memory, processors, devices, information

Virtual Memory System gives best performance if the application program has :

- a) Spatial locality b) Temporal locality
- c) Spatial and temporal locality d) Less page faults

A vector space consists of the following operations -

- a) Vector addition and scalar multiplication
- b) Scalar addition and vector multiplication
- c) Vector addition and vector multiplication
- d) Vector addition

As the depth of recursion increases :

- a) stack size increase b) Stack size decreases
- c) Program code increases d) execution time decreases

Let $A =$

$$\begin{vmatrix} 2 & 0 & 0 & 0 \\ 1 & 2 & 0 & 0 \\ 0 & 0 & 2 & 0 \\ 0 & 0 & a & 2 \end{vmatrix}$$

The characteristic polynomial for A is -

- a) $(x - 2)^2$ b) $(x - 2)^4$
- c) $(x - 2)^3$ d) does not exist

Hashing function is selected such that :

- a) it reduces search time b) storage space is less
- c) number of elements in all equivalence classes are equal
- d) number of elements in all equivalence classes are small

The Grey Code equivalent of binary 1100 is -

- a) 1011 b) 1101 c) 1010 d) 1100

The more number of registers in CPU will result in :

- a) fast context switching time b) slower context switching time
- c) increasing execution speed d) improved memory access time

43. The 2's complement of binary number 10110 is -

- a) 01010 b) 10110 c) 00110 d) 01001

44. Function arguments in C are passed by :

- a) value b) reference c) register d) none

45. A binary half adder -

- a) adds two binary digits & produces their sum & carry
- b) adds half the sum to the carry
- c) adds two binary digits and carry from previous addition
- d) adds two binary digits at half the speed

46. Function arguments in C are :

- | | |
|-----------------------------|--------------------------|
| a) original copy | b) local copy |
| c) pointer to original copy | d) pointer to local copy |

47. For the design of a binary counter the preferred type of flip-flop is -

- a) D flip-flop b) SR flip-flop
- c) Latch d) JK flip-flop

48. Larger Cache block size captures :

- a) more of spatial locality b) more of temporal locality
- c) more hits d) more Cache replacements

49. The switching time associated with TTL circuits is usually -

- a) 10 microseconds b) 10 nanoseconds
- c) 100 microseconds d) 50 nanoseconds

50. Interleaving of memory is helpful in :

- a) achieving low cost memory system
- b) achieving concurrent access to more than one memory module
- c) improving memory access time
- d) hiding memory latency

51. Micro-Program is the name for -

- a) a source program in a computer
- b) a set of instructions indicating primitive operations
- c) program written for microprocessor
- d) a program of very small size

Data is transmitted in Ethernet at the rate of :

- a) 4 Mbits/sec.
- b) 10 Mbits/sec.
- c) 100 Mbits/sec.
- d) 9600 baud.

An index register in a computer is for -

- a) Performance arithmetic logic functions
- b) Temporary storage of results
- c) Modifying address
- d) Counting the number of programs executed

A device driver is a program which :

- a) controls a device
- b) help CPU to perform I/O
- c) communicates between operating system and system hardware
- d) runs on the peripheral

An example of volatile memory is -

- a) Semiconductor RAM
- b) ROM
- c) EPROM
- d) Magnetic Tape

A CPU executes every instruction in two cycles (fetch and execute). The performance of a 16MHZ CPU with zero wait state memory with that of 20MHZ with one wait state memory is :

- a) equal
- b) better
- c) less
- d) can't say

A program counter in a digital computer -

- a) Points to the address of the next instruction
- b) Counts the No. of program instructions
- c) Points to the address of the current instruction
- d) Points to the address or the current of the next instruction

The richness of a programming language is determined by its :

- a) library
- b) operators
- c) datatypes
- d) functions

Barrier voltage in a P - N junction is caused by -

- a) thermally generated electron and holes
- b) diffusion of majority carries across the junction
- c) migration of minority carries across the junction
- d) flow of drift current

60. Semantic errors can be detected :

- a) only at run time
- b) only at compile time
- c) at run time and compile time
- d) during debugging

61. The temperature coefficient of an intrinsic semiconductor is -

- a) positive
- b) negative
- c) zero
- d) like metals

62. Relative address is used to make the application program :

- a) portable
- b) structured
- c) efficient
- d) execute faster

63. A common emitter connected transistor has a voltage gain which is -

- a) low
- b) unit
- c) high
- d) very high

64. In circuit switching the switching circuits :

- a) remain static till the end of communication
- b) change as they communication proceeds
- c) are multiplexed during the communication
- d) are active

65. If a transistor is required to match a 100 ohm signal source with a high impedance output circuit, you would use a -

- a) common base
- b) common collector
- c) common emitter
- d) emitter follower

66. Memory latency is higher for :

- a) Cache
- b) main memory access
- c) Register access
- d) disk access

67. The effective Beta of a Darlington pair using transistors of Beta value 100 is -

- a) 10,000
- b) 1000
- c) 100
- d) 200

68. Semaphores are used to :

- a) handshake I/O requests
- b) terminate a process
- c) indicate an event
- d) synchronize processes

69. MOSFET operates in -

- a) depletion mode only
- b) enhancement mode only
- c) depletion and enhancement mode
- d) neither enhancement nor depletion mode

87. The life of geo-stationary satellite depends on -
 a) its dry mass b) **capacity of its solar array**
 c) the fuel open for corrections
 d) eclipse operating capability
88. A word or symbol in a program that stands for itself is called
 a) a constant b) a literal c) location d) orthogonal
89. The wave length popularly used in fibre-optic transmission is -
 a) 1,300 nanometers b) 5,000 nanometers
 c) 200 nanometers d) 680 nanometers
90. An example of a fourth generation database language is
 a) C++ b) dBase-III Plus c) AnsiCOBOL d) 4 GL
91. A typical fibre-optic detector is -
 a) step recovery diode b) light emitting diode
 c) avalanche photo diode d) field effect transistor
92. Information Theory is
 a) the study of Computer Science as Information
 b) the study of information by mathematical methods
 c) the study of information by measurement
 d) the study of information using knowledge-based system
93. A modem is a device used for -
 a) digitising voice data b) transmission of data on lines
 c) modulating and demodulating signals sent on a line
 d) suppressing noise interference
94. In-line program is
 a) a program generated on a computer terminal
 b) a program without a loop
 c) a program without comments
 d) an efficient way to control program timing

95. Mono-mode is a term used in -
 a) Fibre-optics b) Radar
 c) Satellite Communication d) Magnetics
96. Daisy chaining is
 a) a means to prioritize I/O interrupts
 b) Another name for IEE 488 interface
 c) a means of connecting a number of devices in a sequence
 d) a cable connected from controller to the nearest device
97. HDLC is a term for -
 a) Data Communication Protocol b) Synchronising Pulses
 c) Gain Control in Receivers d) Error checking
98. The first language which provided data abstraction facility is
 a) FORTRAN
 b) Ada
 c) C++
 d) SIMULA
99. A gateway -
 a) is a place where Radars are connected
 b) permits dissimilar networks to communicate
 c) bifurcates the RF path of a transmitter
 d) is a feeder cable
100. Data link layer is part of
 a) Network protocol b) Data hierarchy
 c) Seven layer network protocol d) ISO LAN Standard

1. Ethernet is a name of -
a) medium of computer communication
b) network for computer communication
c) procedures for computer communication network
d) software for computer communication
2. Ethernet is a
a) Connecting mechanism for computers b) Coaxial cable
c) a part of the OSI seven layer reference model d) a LAN
3. A local area network capable of handling several data streams simultaneously is described as -
a) LAN b) Baseband c) Broadband d) PCnet
4. CSMA/CD is
a) a datalink control protocol
b) a method of detection of errors
c) Multiple Access for networking schemes
d) a Data link control applicable to a broadcast network
5. The method of transmission used in a PC network or cluster is usually -
a) asynchronous b) synchronous c) fibre-optics d) burst
6. A clocked and flip flop with a single input is called
a) a JK flipflop b) Binary switch
b) Schmitt trigger d) D Flip flop
7. If several stations in a network want to use a single channel without interfering with one another, the technique used is called -
a) carrier sense b) Phantom-freeze
c) Packet switching d) Multiplexing
8. Deque stands for
a) a double ended queue b) a linear list
c) a list in which insertion and deletions are made at the ends d) A stack
9. In a monolithic IC, resistors are formed from -
a) ceramic material b) copper
c) P-type semiconductor d) Aluminium deposition

10. An algorithm which combines linear interpolation and binary search is called
 - a) Knuth's algorithm
 - b) Dekkers algorithm
 - c) de Morgan's algorithm
 - d) Stone braker algorithm
11. ICs made by sputtering of materials on a ceramic substance are called –
 - a) Monolithic
 - b) Hybrid
 - c) Thickfilm
 - d) Thinfilm
12. Redundant data is usually appended to actual data for the purpose of
 - a) formatting
 - b) error correction
 - c) error protection
 - d) error removal
13. Any digital system can be completely fabricated using –
 - a) All NOR gates
 - b) all NAND gates
 - c) AND and OR gates only
 - d) (a) and (b) above
14. An example of set of graphical routines that can be used by application programmers is called
 - a) GINO
 - b) GKS
 - c) GIGO
 - d) 4GL
15. Data can be transferred from an input device to Memory without the intervention of the processor by –
 - a) A READ Operation
 - b) A WRITE Operation
 - c) A DMA transfer
 - d) Not possible
16. A Micro Controller is
 - a) An LSI Microprocessor
 - b) A Short Instruction Set Controller
 - c) A single chip micro computer
 - d) A Microprocessor based system for control applications
17. The microprocessor used in a PC (AT) –
 - a) 8085
 - b) 80186
 - c) 80286
 - d) 8088
18. Concurrency is
 - a) a process of running two computers at the same time for the same job
 - b) Two or more programs progressing at the same time
 - c) A term that describes parallelism in computers
 - d) Progressing of two or more activities in parallel

19. A 16 bit computer can address locations upto -
 a) 65535 b) 65536 c) 32768 d) 32767
20. A means of inserting or deleting bits on high speed data links is called
 a) bit stuffing b) bit manipulation
 c) bit slice processing d) bit orientation
21. A user could run a program larger than main memory by which of the following techniques ?
 a) Multiprogramming b) Time sharing
 c) Overlays d) Multiprocessing
22. An example of a non Von Neumann architecture is
 a) Bit slice machine b) Instruction Set Architecture
 c) Data Flow Machine d) Turning machine
23. Accumulator is used to store :
 a) the next executable instruction
 b) the next instruction address
 c) results of either arithmetical or logical operations performed by the ALU
 d) Program start address
24. The latest in the DOS environment is
 a) Spreadsheet b) dBase-III Plus c) Windows d) Open Systems
25. Which of the following was proposed specifically as a standard communication code ?
 a) BCD b) ASCII c) EBCDIC d) Alphanumeric
26. A PCB (Printed Circuit Board) in which other boards can be plugged is called
 a) Master Control b) Mother Board c) Backplane d) Control Board
27. Many sorting methods operate by comparing the keys of two records and switching the positions of the records if they are out of order. Which sorting method is the fastest ?
 a) A method which minimises switching possibly at the expense of comparing
 b) A method which minimizes comparing by taking advantage of the order of the original data
 c) The system sort is always the fastest
 d) More information is needed about the amount and organisation of memory the amount and order of the data and the size and characteristics of the key field (s)

28. A de multiplexer is a device with
 a) One input and many outputs b) Many inputs and one output
 c) One input and one output d) Many inputs and many outputs
29. The original order of the data being sorted may affect the speed of the sort. Which of the following orders will be sorted fastest ?
 a) The original order is the sorted order
 b) The original order is the reverse of the sorted order
 c) The original order is random
 d) Any of the above may be fastest, depending on the sorting method
30. DIP stands for
 a) Dedicated Input processor b) Dual Inline Package
 c) Digital Integrated Plugboard d) Dynamic Input Programmer
31. What is the minimum number of direct comparisons between the keys of two records that is necessary to sort 100 records ?
 a) 0 b) 99 a) 665 d) 4950
32. Gray code equivalent of decimal 8 is :
 a) 1001 b) 0100 c) 1100 d) 1000
33. Hashing is a terminology used for
 a) Accessing a database b) arranging data
 c) table lookup d) organising tables
34. For the design of a binary counter the preferred type of flip-flop is :
 a) D flip-flop b) SR flip-flop c) Hatch d) JK flip-flop
35. A 8-bit PCM System with 8 KHz sampling rate will result in
 a) 16 K bits per second b) 15 Kilobytes per second
 c) 64 Kilobytes per second d) 64 Kilobits per second
36. What are the following formulae ?
 $(A \cup B)' = A' \cap B'$ $(A \cap B)' = A' \cup B'$
 (Where the complement of a set S is indicated by S')
 a) Euler's formulae b) Stirling formulae
 c) Wallis formulae d) De Morgan formulae

48. DMA is a scheme for transferring information directly between the :
a) CPU registers and the I/O devices b) CPU registers and memory
c) Memory and I/O devices d) General purpose registers
49. Simulation is a process by which
a) one machine behaves like a second machine
b) programmes are debugged
c) an idealised and abstract machine is defined
d) A machine language instruction is interpreted
50. Which pair of the following are the procedure oriented programming languages :
a) FORTRAN, LISP b) PROLOG, LISP
c) PROLOG, pascal d) FORTRAN, pascal
51. A programming language used for teaching programming discipline is
a) SIMULA b) PASCAL c) COBOL d) FORTRAN
52. Consider the following segment of code written in a procedural language :

```
READ M;  
X = 12;  
LOOP 1 : DO INDEX = M TO 25 By1  
    X = X + 1;  
END LOOP1;  
PRINT X;
```

the value of 'X' that will be printed when the loop is entered with M = 30 is :

- a) 12 b) 13 c) 17 d) 0

53. A push down stack is the same as
a) LIFO Stack b) Linear list c) FIFO stack d) Queue
54. Which of the following is an example for a dynamic data structure ?
a) Array b) Record c) Stack d) Block
55. A form of computation inspired by the structure of the brain is called
a) Neural net b) Weighted digraph c) AI d) Summing node
56. If A = 5 and B = 10, where B is real variable, what is the value of an integer
variable C in the statement C=(A/B)+A
a) 5.5 b) 5 c) 1 d) 10

68. NEXT [J] = [0,1,2,3....]

S and P are Vectors of size M and N respectively

and N > M

J = 1

K = 1

Repeat while J ≤ M and K ≤ N

Repeat while K > 0 and S[J] = P[K]

K = NEXT [K]

end repeat

K = K + 1

J = K + 1

end repeat

How many times the value of K is changed

(excluding the initialisation) (maximum value)

a) N Times b) M times c) N*M times

d) N * (N+1) + N-1

2

39. N is a non zero positive integer

Product = 1

Repeat while N ≤ 0

Product = Product * N

N = N - 1

end repeat

The value of Product is

a) Factorial N

N-1

b) $N \cdot \frac{N-1}{2}$ c) 0 d) N^2

70. Read (CODE)

Case 'R' : Read (Amount)

Case 'D' : Delete (Amount)

Case 'W' : Write (Amount)

If CODE is 'X' then

a) Compilation error

b) Memory overflow

c) Illegal function call

d) Runtime error

71. V=[1,5,8,9,10]

sum = 0

Repeat for K=1 to 3

Sum = Sum + V[K]

end repeat

What is the value of sum

a) 33 b) 14 c) 8 d) 27

72. If F=N

then F=1

else F=F+1

end if

If F is a pointer, then the above statements

a) check if F=N

b) Represent pointer update of a circular buffer

c) A circular buffer is initialised

d) Checking for bounds

73. F is a counting semaphore

If F = R

then F = R = 0

Return

end if

The above program represents

a) Waiting for event occurrence and initialising

b) Clear the variable F and R

c) Synchronising F and R

d) Delay loop

74. A Coprocessor is

a) RISC Precessor

b) Arithmetic Processing chip

c) Accelerating processor

d) Application specific Processor to host processor

75. $i = 5;$

If ($N > 0$)

 int i, /* declare variable i */

 for ($i = 0, i < n, i++$)

}

In the above C Program

- a) i cannot be declared inside 'if' block
- b) both ' i 's are unrelated
- c) i value will change if $n > 0$ is true
- d) Compilation will give error

76. Swap (int x, int y) :

{

 int comp ; comp = X ; X is changed

 X = Y ;

 Y = comp ;

}

Swap (a,b) ;

The above C statement will swap X and Y

- a) a and b are swapped
- b) swaps copies of a and b
- c) swaps addresses of a and b
- d) none

77. If pa is a pointer to an integer array and declared as int *pa ; then the assignment

$pa = \& a[0]$;

a) sets the pointer to address of the first element of the array

b) sets the pointer to the first element of the array

c) sets the pointer to 0

d) sets the pointer to the array a [N]

78. A pointer is a

- a) character string
- b) static
- c) variable
- d) address of memory

79. If p is a pointer then the following C statement $p = 100$:

means

a) Pointer is initialised to 100

b) address 100 is initialised

c) p is assigned to the address of 100

d) illegal statement

ANSWERS

COMPUTER SCIENCE-I

1. a) 11. a) 21. b) 31. a) 41. a) 51. b) 61. a) 71. d) 81. c) 91. d)
2. b) 12. c) 22. — 32. b) 42. c) 52. a) 62. a) 72. a) 82. a) 92. b)
3. a) 13. c) 23. d) 33. c) 43. b) 53. b) 63. c) 73. b) 83. b) 93. a)
4. c) 14. b) 24. a) 34. a) 44. b) 54. c) 64. c) 74. a) 84. c) 94. d)
5. b) 15. d) 25. — 35. d) 45. c) 55. b) 65. a) 75. c) 85. b) 95. a)
6. c) 16. d) 26. b) 36. d) 46. c) 56. c) 66. c) 76. c) 86. a) 96. c)
7. c) 17. a) 27. b) 37. c) 47. b) 57. a) 67. c) 77. a) 87. b) 97. c)
8. b) 18. d) 28. b) 38. c) 48. c) 58. c) 68. b) 78. b) 88. b) 98. d)
9. c) 19. b) 29. c) 39. b) 49. b) 59. c) 69. d) 79. b) 89. b) 99. c)
10. c) 20. d) 30. c) 40. d) 50. b) 60. a) 70. c) 80. a) 90. c) 100 c)

COMPUTER SCIENCE-II

1. d) 11. d) 21. a) 31. d) 41. c) 51. b) 61. b) 71. b) 81. a) 91. b)
2. d) 12. c) 22. c) 32. c) 42. c) 52. b) 62. — 72. b) 82. a) 92. b)
3. d) 13. c) 23. b) 33. a) 43. b) 53. c) 63. b) 73. d) 83. c) 93. c)
4. a) 14. c) 24. d) 34. d) 44. a) 54. a) 64. a) 74. c) 84. c) 94. d)
5. d) 15. — 25. a) 35. a) 45. a) 55. a) 65. d) 75. d) 85. b) 95. a)
6. a) 16. b) 26. a) 36. d) 46. b) 56. b) 66. d) 76. c) 86. c) 96. a)
7. c) 17. b) 27. a) 37. a) 47. d) 57. a) 67. a) 77. b) 87. b) 97. a)
8. b) 18. a) 28. d) 38. a) 48. c) 58. c) 68. d) 78. d) 88. a) 98. d)
9. c) 19. c) 29. d) 39. b) 49. b) 59. b) 69. c) 79. c) 89. — 99. b)
10. c) 20. c) 30. b) 40. a) 50. b) 60. a) 70. b) 80. c) 90. d) 100 c)

COMPUTER SCIENCE-III

1. b) 11. c) 21. c) 31. b) 41. d) 51. b) 61. a) 71. b)
2. d) 12. b) 22. — 32. c) 42. d) 52. b) 62. c) 72. b)
3. d) 13. d) 23. c) 33. c) 43. b) 53. a) 63. a) 73. a)
4. c) 14. b) 24. c) 34. d) 44. b) 54. c) 64. d) 74. d)
5. b) 15. c) 25. b) 35. c) 45. b) 55. a) 65. c) 75. b)
6. a) 16. c) 26. c) 36. d) 46. a) 56. b) 66. d) 76. b)
7. b) 17. c) 27. d) 37. b) 47. c) 57. b) 67. a) 77. b)
8. a) 18. d) 28. a) 38. a) 48. c) 58. c) 68. d) 78. d)
9. c) 19. b) 29. d) 39. d) 49. c) 59. c) 69. — 79. a)
10. a) 20. a) 30. b) 40. c) 50. d) 60. d) 70. d) 80. —

Blank means none of the above.